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Tropical Ecology
Volume 58, Issue 2, 2017, Pages 251-269

Spatio-temporal variation in phytoplankton communities along a salinity and pH gradient in a tropical estuary (Brunei, Borneo, South East Asia)

(Article)

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Abstract

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Tropical estuaries often have a low buffering capacity and may experience acidification, both naturally through microbial degradation and run-off from acid sulphate soils (ASS), or from various anthropogenic sources. Here, we describe phytoplankton communities from the turbid, acidified, and eutrophic Sungai Brunei and Brunei Bay estuarine system. Four sampling stations were selected, representing the full spectrum of the salinity (0.4-28.5 PSU) and pH (5.87-8.06) gradients associated with this system. A total of 25 microalgal families of phytoplankton (including 22 diatom and seven dinoflagellate genera) and one of ciliates were recorded in the survey, which was carried out between August 2011 and June 2012. Phytoplankton density ranged from 7 to 9107 cells ml^{-1}. Diatoms were a dominant component of the communities, with Nitzschia spp., Rhizosolenia spp., and Leptocylindrus sp. reaching the highest abundances. Phytoplankton communities present at the four sampling stations differed significantly in terms of both algal abundance and composition and were strongly influenced by the effect of season (30% of the total variance). The interactive effects of pH and salinity, and of pH and temperature, explained 16.7% and 17.5% of the total observed variation, respectively. A positive correlation between pH and the number of taxa found was detected. The functional diversity observed in phytoplankton from the Brunei River estuary was generally low with few taxa adapted well to the chronically low pH conditions. This study provides baseline data about structural and compositional changes in a tropical estuarine phytoplankton community associated with various levels of acidification of both natural and anthropogenic origins. © International Society for Tropical Ecology.

Author keywords

Acidification Diatom Eutrophic Monsoon Plankton Sungai brunei Turbid

Indexed keywords

Species Index: algae Bacillariophyta Ciliophora Dinophyceae Leptocylindrus Nitzschia Rhizosolenia

ISSN: 05643295
CODEN: ISTEB
Source Type: Journal
Original language: English
Document Type: Article
Publisher: International Society for Tropical Ecology

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